Application of a Prize Mechanism to Address Data Utilization Challenges at Utilities

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1 Introduction

The electric industry sector is facing an "explosion" of data from a variety of sources. Electric sector stakeholders need to define how to capitalize on large datasets, both those they create and those from other sources (like data on weather, buildings, electric vehicles, etc.), to improve reliability and resilience and meet the changing system dynamics from renewable integration.

For the electricity sector to fully utilize these vast new datasets, it must undergo a transformation in how it manages data quality, storage, and processing. Often, before a new tool can be utilized, infrastructure operators and engineers must first ensure that their underlying digital infrastructure is conducive to the new types of analytics being developed. The traditional data storage and management tools used by utilities may not be well suited to the large volumes, variety, and velocity of data.

The U.S. Department of Energy (DOE) Office of Electricity (OE) is committed to accelerating research, development, and demonstration of new technologies and tools within the electricity sector to advance reliability, resilience, and affordable operation of the power system.

Through the prize mechanism, OE identified two widespread data-related challenges for utilities—load modeling and data analysis automation—and offered an opportunity for utilities and teams of software engineers to identify additional challenges faced by utilities.

After completing one round of the American-Made Digitizing Utilities Prize, OE, the National Renewable Energy Laboratory (NREL) as the prize administrator, and Pacific Northwest National Laboratory (PNNL) as the domain experts have compiled the results and lessons learned to feed into the second round of the prize.

2 Prize Overview

2.1 Opportunity Space

The February 2021 report by the Electricity Advisory Committee titled "Big Data Analytics: Recommendations for the U.S. Department of Energy" outlined the need for DOE support in advancing data analytics for existing data sources within utilities.[1] The report highlights the "big data" utilities now have access to, including field measurements, weather measurements, asset monitoring, and customer-driven data. However, the report also identifies a series of challenges associated with utilizing this data, including "insufficient training to perform data collection, curation, cleansing, and feature extraction." The American-Made Digitizing Utilities Prize and OE responded to this need by creating a low-barrier, flexible avenue to connect utilities with software developers and data experts to explore and propose solutions to these opportunities and challenges.

2.2 Utilizing the Prize Mechanism

Prizes, authorized under the America COMPETES Act, are one tool that OE can use to incentivize innovation and provide financial awards for successful initiatives. OE chose to utilize the prize mechanism (versus other funding mechanisms) for the following reasons:

- **Prizes pose a lower risk to OE.** Instead of funding a plan for work to be done in the future, OE is rewarding work completed to date. OE reviews all the accomplished work before providing funding.
- **Prizes are flexible.** Once a prize competitor is awarded funding, they can use it however they see fit. Particularly for developing new software solutions, where competitors may have to pivot approaches, flexible funding helps keep product development on track.
- **Prizes, like the Digitizing Utilities Prize, can be phased.** OE can set increasingly difficult goals to achieve and award larger funding amounts along the way. This gives OE the opportunity to rapidly prototype many different ideas, track the progress of these ideas, and provide the largest amount of funding to the ideas that have proven to be most successful.

The prize mechanism also offered OE a non-traditional method for engaging with multiple utilities, while also connecting them with new teams of researchers, software developers and data experts. Using the prize mechanism, OE was also able to support numerous solutions for a variety of utility challenges.

Although there are basic requirements for a prize, it can be designed and customized to meet the specific goals set out by DOE, and in this case, OE. The American-Made program offers the basic structure and customization for prizes, described in the Appendix.

2.3 The American-Made Digitizing Utilities Prize

OE elected to run the Digitizing Utilities Prize as part of the American-Made program. The American-Made Challenges are a suite of over 70 prizes across DOE focused on supporting innovations in energy. The prizes are administered by NREL. A benefit of the prizes is that, along with cash support, the American-Made program can connect prize participants with experts and services across the country to help them be successful in implementing their innovation. Additionally, through the Digitizing Utilities Prize, competitors had access to subject

[1] https://www.energy.gov/oe/articles/eac-big-data-analytics-work-product-final

matter experts at Pacific Northwest National Laboratory (PNNL).

The American-Made Digitizing Utilities Prize offered a total prize pool of $1.1 million across two phases. In Phase 1 – Plan, teams of developers formed and proposed a plan for how to address a data challenge presented by a utility. Nine teams were awarded $75,000 each in cash for this phase and were eligible to compete in the second phase of the prize. In Phase 2 – Progress, teams worked with utility partners over six months to build on their initial plans and to create and deliver a software solution addressing the utility's proposed issue. Three teams were awarded a portion of the $425,000 cash prize pool.

The Digitizing Utilities Prize offered competitors three different tracks.[2] Competitors selected which track they wanted to compete in for the prize. Prior to the launch of the prize, NREL issued a public Sources Sought notice to identify utility partners willing to provide examples of problems related to data, such as energy use data, synchrophasor data, weather data, fire assessment data, and more. Tracks 1 and 2 each invited competitors to work on one of these predefined problems with a predefined utility. Track 3, on the other hand, enabled competitors with existing utility partners to compete by addressing their own previously identified data challenge.

For Track 1, Bonneville Power Administration (BPA) provided an example of the need for load modeling to help correctly forecast future demand. For Track 2, Dominion Energy provided an example of the need for automation of data analysis. Presenting these predetermined examples and utility partners opened participation in the prize to a wider audience. Any software engineers, developers, and academics who had the skills and expertise to solve these challenges could compete. They did not need to have a preexisting relationship with a utility. To incentivize work on a broader set of challenges, OE invited contestants to bring their own utility partner with an identified problem to compete under Track 3.

[2] Prize Phase is a distinct, progressive period in the prize competition. Prize Track is a topic area that competitors chose to focus on while going through the phases.

3 Track 1 – Load Modeling

Bonneville Power Administration (BPA) and Clark County Public Utilities District partnered together to provide working examples of the need for load modeling. They asked teams to develop software-driven methods to provide more accurate load modeling and forecasting capabilities. BPA's challenges focused on several different tasks:

> Weather Sensitivity Analysis – Weather-sensitive loads, particularly heating and cooling, are difficult to characterize, as they depend on the season, time of day, and human behavior. Two identical homes experiencing the same weather conditions may exhibit different load profiles, based on their thermostat set points and occupancy patterns. Teams were asked to address the dynamic nature of these weather-sensitive loads and to generate models to characterize their behavior at the building, feeder, and substation levels.
>
> Electrification Estimation – Utilities need to determine the electrification of specific areas to understand the composition of a feeder/substation, but they often do not have access to this information and must estimate it from metered data. Teams were asked to develop a method of generating estimated electrification for substations with a variety of commercial/residential proportions. The expected result was to be able to identify the percentage of residential homes and commercial buildings with electrical heating, cooling, water heating, and cooking.
>
> Impact of Future Electrification – As building electrification changes over time, particularly in response to new energy-efficient technologies, generating accurate load composition becomes increasingly complex. Teams were asked to develop models that would provide reasonable future electrification scenarios and estimate future peak demand under extreme weather conditions.

Three teams, Cadmus, Occam.ai, and Grid Vision Technologies, were selected to work closely with BPA in Phase 2 of the prize to develop and pilot their solutions. Cadmus and Occam.ai both developed an interactive software platform, whereas Grid Vision Technologies focused on different data analytics processes to address weather sensitivity analysis, estimate electrification, and develop future electrification scenarios. Ultimately, Cadmus' solution was selected as the winner of these three solutions at the end of Phase 2.

Cadmus is a consulting firm with over 1,000 consultants providing services internationally. Participating in the prize provided an opportunity for some of Cadmus' staff to dive into an interesting project. Cadmus used machine learning (ML) modeling techniques to provide insights into the distribution network and characterize weather-sensitive energy loads. They developed an open-access and interactive software solution using R programming that allows users to upload their own data to generate accurate load modeling and forecasting capabilities. Cadmus' solution combines two model types—a generalized additive model (GAM) and an open-source ML model ("random forest")—to increase the predictability of extreme weather data. The GAM was used to analyze the contribution of different variables that affect load, such as hour of the day, day of the year, temperature, wind speed, visibility distance, and humidity. The ML model was used to estimate the electrification in the existing condition by correlating existing building characteristics and their different electric appliances. These specific models were selected because they can be used for different geographies with different weather and load characteristics.

Occam.ai was a diverse team, comprising of a data scientist, a software engineer, a Ph.D. student, a professor, and a company executive. The team provided analytics and highly configurable scenario-based forecasts through an easy-to-use software interface. They developed a set of basic functions that mapped time and weather variables to hourly energy demand for different load types, such as heating, cooling, and lighting. Then, they fit a nonnegative combination of basis functions to the hourly substation-level demand data to estimate the composition of each substation. This model can be modified and configured for different use scenarios and different utilities, and their graphical user interface allows users to upload their own data.

Grid Vision Technologies team, which was composed of a professor and several graduate students from Missouri University of Science and Technology, used three different data analysis methods, including regressions and optimization methods, to estimate the load composition and make forecasts based on these estimates. Weather sensitivity analysis was also done with the Rothfusz regression.

From the work conducted under Track 1, we see that there is a need for an easy-to-use software interface where utilities can upload their own data. Both Cadmus and Occam.ai developed platforms that could be useful to utilities moving forward. In all three instances, the availability and accuracy of data was critical to the models' success. Teams took advantage of publicly available datasets, including the Northwest Energy Efficiency Alliance's Home Energy Metering Study, NREL's End-Use Load Profiles, NREL's ResStock™ and ComStock™, and the National Oceanic and Atmospheric Administration's historical weather data, to build their models. However, the models also require clean data from the utilities on building stocks for substations and feeders.

4 Track 2 – Data Automation

Dominion Energy provided the specifics for Track 2, focusing on the challenge of data analysis automation. Particularly with developments in inverter-based generation, staggering localized loads, regulatory demands, and sustainability objectives, there is a need to evaluate, measure, and understand new data trends. Synchrophasor data could be a powerful tool for understanding these new trends, but it often relies on manual processing by staff with specific technical expertise. Through Track 2, Dominion gave teams the opportunity to propose automated processes for gathering valuable information from large amounts of data.

Three teams, ScaLaDe, Red Hawks, and Automatility, worked with Dominion in Phase 2 of the prize. From these three teams, ScaLaDe was selected as the Track 2 winner.

Team ScaLaDe, with members from Siemens Corporation and Southern Methodist University, used unsupervised ML methods to associate embeddings to blocks of spectrogram information extracted from Phasor Measurement Unit (PMU) data and filtered in time and frequency. The goal of the solution was to automate the detection and analysis of relevant oscillation patterns. ScaLaDe developed five software modules comprising data quality, preprocessing, ML model training, model selection, and sample embedding applications. Different autoencoder ML models were defined, trained, and tested, and the results were compared in terms of their test loss, capturing pattern characteristics by means of the embeddings. Finally, sample analysis was demonstrated based on Dominion's provided sample data. As usual for ML applications, significant computation resources are required for training the models, but once they are trained, inference is computationally cheap.

Red Hawks, another finalist team with members from Grid Protection Alliance (GPA) and Rensselaer Polytechnic Institute (RPI), developed data analytics functions using PMU data for asset diagnostics and system performance evaluation. Their method of monitoring voltage regulation is applicable to synchronous generators and inverter-based resources, such as wind turbines and solar photovoltaic systems. With Dominion's data, Red Hawks was able to identify the control performance of photovoltaic plants and STATCOMs during ambient conditions to monitor whether equipment was running properly.

Automatility, the third team working in Track 2, provided a solution that enables utility employees, even those without a strong synchrophasor, coding, or electrical background, to uncover insights in their data. Dominion was seeking processes to make their wealth of synchrophasor data more impactful and broadly available throughout their organization. The Automatility team created a data interrogation module that includes a calculation script creation tool, a query configuration platform, a query repository, and visualization and aggregation capabilities.

From the work conducted under Track 2, the need for solutions which can uncover findings and insights from large amounts of data without the need for individuals with specific technical expertise is clearly highlighted. Although each team utilized different methods in developing their solution, each uncovered approaches that would enable a utility team which did not have the previously necessary technical expertise to uncover critical findings.

5 Track 3 – Competitor Identified

The third prize track allowed teams already working with a utility to identify their own digitization or data challenge and propose a solution. Electrify USA, Team Moonshot, and the Sun Team were selected to continue working with their utility partners in Phase 2. Electrify USA was selected as the Track 3 winner as well as the Grand Prize winner from among Cadmus and ScaLaDe, the other track winners in Phase 2.

The increase in electric vehicle (EV) adoption brings new challenges and opportunities to utilities, particularly around load distribution, long-term infrastructure needs, and options for virtual power plants. The Electrify USA team, with representation from the University of California, Riverside, Baltimore Gas and Electric, Pepco Holdings, and Exelon, developed a data-driven planning platform for predicting EV adoption, charging profiles, and impacts on the distribution network at the feeder level in Maryland. The team delivered user-friendly software to the utility, with three modules that can function independently or build on each other.

Using historical data, the team developed a generalized Bass diffusion model to predict EV adoption from 2023 to 2040 in Maryland at multiple geographical levels, which was helpful for the utilities in long-term planning. Then, using a recurrent neural network, they developed an EV charging load profile forecast. The forecast provided utilities with information about day-ahead operations, demand response, and market participation. This input was used to analyze the impacts of EV charging on the distribution grid. Using Python and OpenDSS, the software module simulates power flow at the feeder level at various levels of EV utilization. This final step allowed utilities to proactively analyze feeders and make informed decisions about upgrades instead of only reacting to problems. This includes insights into potential voltage violations and overloaded transformers under various planning and operational scenarios.

Team Moonshot by Powder River Energy Corporation (PRECorp), an electrical cooperative in northeast Wyoming, proposed an ML process to review voltage and load interval data in order to detect physical connection issues to mitigate potential wildfires. Addressing connector failures on power lines has increasingly become a part of wildfire mitigation plans for utilities across the United States. However, there has not been an easy, low-effort way to do this, as current methods include physical inspection by utility employees or drones, which do not produce high enough resolution images to be effective. Team Moonshot used advanced metering infrastructure (AMI) interval data to detect whether the measured voltage had significant changes without actual changes in load, which could indicate a degraded electrical connection. When anomalies were identified, line crews could respond. Using this method, PRECorp was able to identify several failures that were repaired prior to an outage or catastrophic event.

The Sun Team, which was a partnership between the University of Central Florida and Duke Energy Corporation, developed a system to identify the root causes of model mismatch by combining domain knowledge with first principles and data analytics. Through the Model Mismatch Root Cause Recommendation System (MMRCRS), power system engineers can upload measurement data and distribution power flow (DPF) data. Voltage deviations between the two are flagged, and the MMRCRS determines what the root cause may be. Using the MMRCRS can reduce the amount of time engineers need to identify and resolve model mismatch errors, a process that typically requires a lot of manual work.

6 Lessons Learned and Future Recommendations

6.1 The Importance of Partnerships

A critical component to the prize was the focus on partnerships between utilities and software developers and data experts. Prizes are often considered an efficient and flexible way to fund work. In this scenario, the prize was also used as an efficient and flexible way to forge partnerships across parties that otherwise would not be connected in a way that brought mutual benefits to both parties. This partnership-focused approach started with a publicly issued Sources Sought that asked utilities to provide a problem or issue they were facing and a description of the relevant data sets. Soliciting utility-defined challenges ensured that the prize was grounded in a practical, real-world environment. The benefit to utilities was the opportunity for multiple groups to propose different approaches and solutions to a single defined problem and allowing the utility to easily test and validate these solutions with real sample data.

For software developers, the prize reduced the barriers often faced when trying to build a connection, and eventually a formal partnership, with a utility. Partnerships often take months of networking and extra financial resources to put in place. By presenting two pre-determined utility partners in the prize, these barriers were eliminated, inviting anyone with an innovative solution to present it. This approach offered innovators and software developers across the nation the ability to be paired with major utilities, get access to data, learn about data challenges, and develop solutions that could help the utility achieve its goals. For teams who already had existing partnerships and relations with utilities, the prize provided a space for continued collaboration and further development of partnerships. In either case, it also allowed them to develop and test their solutions based on real world data that could be implemented in a utility environment.

6.2 The Prize Structure Experience – The Team Perspective

Teams appreciated the reduced paperwork and bureaucracy and increased flexibility of funding that the prize provided. While the cash prize was appreciated, teams also experienced other benefits as a result of participating in the prize. For some teams, the prize was an opportunity to work on a project they otherwise wouldn’t have and it gave them an opportunity to work directly with a utility. For other teams, this was necessary work that needed to be done, but the prize gave an extra incentive to prioritize the work and complete it. For professors, who are typically pressured to find novel solutions for publications, the prize provided an opportunity to work on problems closer to practical application. Regardless of which group teams fell into, teams enjoyed the opportunity to test and validate their solutions with real utility data and network with a major utility partner.

The promotional opportunities through the prize, including social media and press releases, added value to the teams and provided further validation of their work to a broader audience. Several teams had the opportunity to highlight their participation in the prize. Examples include:

- In response to Cadmus’ press release, the Smart Energy Consumer Collaborative added Cadmus’ work to a white paper highlighting 15 projects. Cadmus then had the opportunity to present at the Collaborative’s fall member meeting.
- ScaLaDe’s work on the prize was included in a panel presentation at the IEEE Power and Energy Society General Meeting.

- The University of California, Riverside performed several demonstrations for groups within Exelon.
- PRECorp's participation in the prize was highlighted in the local media, presented to the board of a software company serving the utility industry, and presented at a National Rural Electric Cooperative Association meeting. PRECorp also shared their tool with a neighboring utility as part of the prize.

Several teams reported that the prize allowed nontraditional teams to participate. Had the work been funded under a traditional funding source, they would not have applied. On the other hand, working within the prize mechanism can be a difficult shift for teams more familiar with traditional funding mechanisms. Some teams reported difficulty in subcontracting with partners without a formal contracting structure in place through the funding mechanism.

The phased structure of the prize led to differing views on how to use the Phase 1 winnings. Most teams did not view the Phase 1 winnings as the budget for Phase 2 activities, but some did. A couple of the teams used the funds to set up a project that was then supplemented with additional internal funding. A team's view of the Phase 1 winnings (as compensation for previous work or budget for future work) did not seem to be an indicator of their performance in Phase 2. Rather, it allowed individuals to adjust to their situation, whether it was working in their free time or as a part of a larger company.

6.3 The Prize Structure Experience – The Utility Perspective

One of the aspects of the prize that BPA and Dominion appreciated was the opportunity to connect with individuals and organizations that they were previously unfamiliar with. The utility partners emphasized that efforts should be made to ensure that the applicant pool includes teams that are not already well known and well-funded in the space.

Utilities also appreciated the opportunity to work with software developers and vendors to shape product development to meet the needs of their utility. Some utilities expressed that vendors typically offer monolithic software that cannot be customized without significant investment. Through this prize, DOE encouraged researchers to work with utilities to solve their specific problems, rather than a problem that someone else thinks needs to be solved.

For instance, Pepco Holdings, a utility partner within Track 3, provided utility EV charging session data to their partner team. By using this data and meeting with Pepco to discuss data definitions and caveats, the team at the University of California, Riverside, was able to apply their higher-level data processing and modeling skills to deliver software tools that met the expectations of the utility.

The prize was also an important motivation for utility partners to dedicate resources to a specific challenge. It also gave utilities the opportunity for better communication between executive management and staff and with neighboring utilities.

6.4 Recommendations for Future Prize Rounds and Support

Our assumption for the Digitizing Utilities Prize Round 1 was that establishing relationships with utilities would be a critical barrier for participation in the prize. Therefore, two challenges posed by predetermined utility partners were presented. However, the quantity and quality of submissions to Track 3 of the prize indicated that this was not a prohibitive obstacle. In fact, having predetermined partners added a layer of complication to the prize for both the utility and the team.

There is a role for the prize administrator to provide teaming opportunities between potential competitors and individual utilities. However, the partnership is more successful when utilities and software developers are allowed to build their own organic working cadence without concerns about consistency and fairness across competitors working with the same utility.

Data scientists and researchers without strong backgrounds in power systems who worked closely with their utility partners were able to bring new, useful insights to the utility's challenges. This suggests that the prize administrator should ensure broader outreach about prize opportunities to bring new perspectives, skills, and expertise into the field.

6.5 Advice for Future Participants

Across all tracks, the level of interaction between teams and utilities was a strong indicator of success. Following their experience in Round 1, teams suggested more regular, standing meetings with their utility partners. The short duration of the prize warrants frequent meetings. Active utility engagement, availability for questions, and ongoing feedback were critical to team success. Additionally, teams that took more time to engage with utility staff and ask questions early on, even if it led to a slower start in solution implementation, were more successful throughout the prize.

By design, the prize model does not dictate any required structure, interactions, or activities for teams. Teams were more successful in the prize when they took the initiative to put structure around their relationship with the utility. This included developing clear documentation during Phase 1 around expectations, data sources provided by the utility, computational resources, and description of the work. Prize submissions that included objective measures of performance, with buy-in from partner utilities, were more successful at meeting expectations.

Flexibility is critical for prize participation. The lack of restrictions on the prize funds allows teams to try (and fail) quickly so they can find solutions. This is very different from traditional funding mechanisms. Teams that allowed for flexibility in the types of solutions they researched tended to be the most successful in providing value to utilities.

Across all teams, data sharing was one of the prize's major successes. Dominion's process for quickly giving researchers access to raw measurements worked extremely well. This included the technical ability to provide access to Dominion systems via their archiving and analysis platform as well as a streamlined process for background checks and nondisclosure agreements.

BPA and Clark Public Utilities District were also able to share data with competitors very quickly by anonymizing it first so that nondisclosure agreements were not required. The anonymization did not negatively impact the teams' ability to analyze the data, so this was an excellent example of where this approach was appropriate.

Despite these successes, future teams should remain aware of the challenges that data sharing can create. One team began the process of setting up data sharing agreements three months before the Phase 1 winners were even announced. The data sharing process normally takes 6–8 months, but through a concerted effort and good communication with their legal department, they were able to share the data by the time Phase 2 began. Not all utilities, even those interested in supporting a team, will be able to expend the effort on data sharing without knowing that the work will be done. This will be especially true in scenarios where the utility does not have an existing relationship with the rest of the team. Creating a plan for data sharing early in the process, during Phase 1, will benefit teams.

6.6 Next Steps

Taking these lessons into consideration, OE has launched Round 2 of the Digitizing Utilities Prize.[3] Round 2 encourages any team to partner with a utility to submit a data-driven challenge and potential solution. In Round 2, OE has also partnered with DOE's Office of Cybersecurity, Energy Security, and Emergency Response to highlight a specific interest in cybersecurity-related problems and solutions. Round 2 offers competitors the opportunity to work with their utility partner to submit a solution that either addresses utility data challenges (Track 1), utility cybersecurity challenges (Track 2), or both. Competitor solutions that meaningfully addresses both utility data and cybersecurity challenges are eligible to be selected as winners in both Tracks 1 and 2, doubling their winnings in each phase.

For more information on other American-Made prizes, please visit **americanmadechallenges.org.**

[3] Round 2 refers to a new opportunity for new competitors to participate in the Digitizing Utilities Prize (and incorporates 2 phases and 2 tracks)

Appendix – The Prize Mechanism and American-Made Program

Prizes, authorized under the America COMPETES Act, are one tool that the U.S. Department of Energy is utilizing to incentivize innovation and provide financial awards for successful initiatives. Prizes are awards for work already completed. This means that DOE can set a goal to be achieved, and competitors work toward that goal. At the end of each prize phase, competitors complete a submission outlining the work done and progress made. Competitors who have accomplished the most high-quality work are awarded a cash prize, which they can use however they see fit.

The American-Made program is a U.S. Department of Energy (DOE) research and development ecosystem focused on accelerating clean energy innovation and prizes are a cornerstone of their mission. This unique model combines prizes with a cleantech network and technical voucher funding to incentivize rapid advances in technologies and applications, entrepreneurship, capacity and community building, and workforce development, forging new connections among the nation's entrepreneurs, private sector, and DOE's national laboratories. These three program pillars work together to effectively speed new projects toward their commercial and implementation-ready potential: cash prizes incentivize new ideas and engage new participants; a network of expertise and resources supports their success; and voucher funding provides access to state-of-the art laboratory facilities and researchers.

Prize competitions in general are a rapidly growing mechanism to fund innovative ideas and concepts. When compared with other funding available to entrepreneurs and communities, prizes hold undeniable appeal: they typically have a low barrier to entry, more progress on shorter timelines, and faster funding distribution, making it relatively easy for anyone with ideas, knowledge, and skills to compete. While prizes are a relatively small part of the larger funding environment, their scope and reach have increased substantially over the past two decades. As the breadth of prizes has grown, their complexity, diversity, and innovative nature have also widened significantly.

With the American-Made Program, DOE has expanded its reach into the prize ecosystem. American-Made is an organized, multifaceted, dynamic approach to government prize funding. It is a fast-paced, engaging way for entrepreneurs, innovators, and communities to earn government funding to fuel their concepts. To date, the program has awarded more than $260 million in cash prizes and support across more than 70 prizes and competitions. Multiple new prizes and competitions are announced each year by DOE offices seeking to advance a concept or solicit ideas from entrepreneurs and other communities. The American-Made program's prizes and competitions, vouchers, and network are managed and administered by the National Renewable Energy Laboratory (NREL).